

CHARACTERISTICS OF MEDICALLY DISQUALIFIED  
AIRLINE PILOTS

Shirley J. Dark  
Civil Aeromedical Institute  
Federal Aviation Administration  
Oklahoma City, Oklahoma

AD A127429



DTIC  
ELECTE  
APR 29 1983  
B

JANUARY 1983

Document is available to the public through the  
National Technical Information Service  
Springfield, Virginia 22161

Prepared for  
U.S. DEPARTMENT OF TRANSPORTATION  
Federal Aviation Administration  
Office of Aviation Medicine  
Washington, D.C. 20591

83 04 29 027

DTIC FILE COPY

1. Report No. FAA-AM-83-5	2. Government Accession No. AD-A127 429	3. Recipient's Catalog No.	
4. Title and Subtitle CHARACTERISTICS OF MEDICALLY DISQUALIFIED AIRLINE PILOTS		5. Report Date	
		6. Performing Organization Code	
7. Author(s) Shirley J. Dark		8. Performing Organization Report No.	
9. Performing Organization Name and Address FAA Civil Aeromedical Institute P.O. Box 25082 Oklahoma City, Oklahoma 73125		10. Work Unit No. (TRAI)	
		11. Contract or Grant No.	
12. Sponsoring Agency Name and Address Office of Aviation Medicine Federal Aviation Administration 800 Independence Avenue, S.W. Washington, D.C. 20591		13. Type of Report and Period Covered	
		14. Sponsoring Agency Code	
15. Supplementary Notes			
<p>16. Abstract</p> <p>Observations on the airline pilot group probably come as close to a true reflection of incidence of disqualifying disease as is possible to observe. Prescreening by airline companies before employment and the stringent Federal Aviation Administration (FAA) requirements for issuance of a first-class medical certificate result in this group being essentially purged of disease prevalence that contributes to higher rates for other groups. Also, because of occupational/economic reasons, these individuals are less likely to voluntarily remove themselves from followup observation for known medical conditions that would preclude FAA medical certification. Conversely, voluntary attrition is a more frequent occurrence among nonoccupationally connected pilots who recognize that they are not medically qualified and, therefore, are never heard from again by the FAA.</p> <p>Age-specific denial rates for airline pilots increase to the highest rate at age interval 55-59. The most significant causes for denial are cardiovascular, neuropsychiatric, and the miscellaneous category. The importance of these causes for denial, particularly above age 45, is again recognized. Age-cause-specific findings for the airline pilot group follow epidemiologic expectations, with age being a significant variable associated with increased rates.</p> <p>Of interest in the data on denial by employer is that the larger employers, many of which have their own medical facilities, have uniformly lower denial rates than smaller employers.</p>			
17. Key Words Airman Certification (Medical) Pilots, Denied Statistical Analysis		18. Distribution Statement Document is available to the public through the National Technical Information Service, Springfield, Virginia 22161	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 14	22. Price

# Acknowledgment

Appreciation is extended to Dr. Audie W. Davis, Manager, Aero-medical Certification Branch, and Dr. Charles F. Booze, Jr., Supervisor, Medical Statistical Section, Aeromedical Certification Branch, for their valuable guidance, comments, and suggestions during the preparation of this study. The author also expresses appreciation to Mrs. Leslie Downey and Ms. Mickey Loveless for their assistance in the review and preparation of this study.



Accession For	
NTIS GRAM	<input checked="" type="checkbox"/>
DEIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A	

## CHARACTERISTICS OF MEDICALLY DISQUALIFIED AIRLINE PILOTS

### INTRODUCTION

Federal Aviation Regulations (FAR's) require that pilots for scheduled and nonscheduled airlines possess a first-class medical certificate to validate their air transport pilot certificate. Airline pilots are required to obtain a Federal Aviation Administration (FAA) medical examination at 6-month intervals and must meet specific requirements for a first-class medical certificate as set forth in FAR 67.13 (b) through (f). If the medical standards are not met, the application for first-class certification is denied. This denial can result from any of several levels of certification review within the FAA, from the aviation medical examiner (AME) to the Federal Air Surgeon.

At the time this study was conducted, Federal Aviation Regulations, Part 67, specified that a medical certificate would be denied if any applicant had an established medical history or clinical diagnosis of any of the following conditions:

1. A personality disorder that is severe enough to have repeatedly manifested itself by overt acts.
2. A psychosis.
3. Alcoholism.
4. Drug dependence.
5. Epilepsy.
6. A disturbance of consciousness without satisfactory medical explanation of the cause.
7. Myocardial infarction.
8. Angina pectoris or other evidence of coronary disease.
9. Diabetes mellitus that requires insulin or any other hypoglycemic drug for control.

The above conditions represent the causes for a mandatory denial. A general denial may be issued, under FAR Part 67, for any other organic, functional or structural disease, defect or limitation that the Federal Air Surgeon finds makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or may reasonably be expected, within 2 years after the finding, to make him unable to perform those duties or exercise those privileges. These findings are based on the case history and the appropriate, qualified, medical judgment relating to the condition involved.

Descriptive studies of airline pilot populations (1,3,4,5,6,7) have shown the rate of medical disqualification to be minimal before the age of 45 years, but to increase rapidly thereafter, with cardiovascular diseases responsible for more than half of this dramatic rise in incidence of disease after age 45. The Orford-Carter study (6) and many others have already emphasized this problem of aging pilots and the increased risk of cardiovascular disease. Orford-Carter also concluded that between the ages of 45 and 60 years, detection of disease assumes far greater importance than in a pilot's younger years. Lavernhe's opinion (5) was that the considerable increase in coronary risk with age warrants examination particularly intended to detect coronary disease among older pilots. Preston (7) and others (1,3) found lower denial rates for airline pilots whose employers have their own medical departments.

This study provides comprehensive data reflecting pertinent denial rates with respect to the general and medical attributes of airline pilots denied first-class FAA medical certification during the 2-year period preceding July 1, 1980. It also further explores the conclusions and findings of the previous studies regarding medical disqualification of airline pilots.

#### METHODS AND SOURCE

The Aeromedical Certification Branch (AMCB) of the Civil Aeromedical Institute is the central screening facility and repository within the FAA for the collection, processing, adjudication, investigation, and analysis of medical data generated by the aeromedical certification and related programs.

The AMCB's computerized medical records provide historical data for both daily screening of document input and for epidemiologic/research purposes. This computer file contains the most recent medical application for all pilots, whether issued, pending, or denied.

The airline pilot denial data were obtained from the computer file as of July 1, 1980, for a 2-year period preceding that date. The active airline pilot population as of December 31, 1978, was used for rate computation and comparison.

Airline pilots were identified by the applicant's response to block 10 of the FAA medical application. The occupation of airline pilot -- defined as pilot for scheduled and nonscheduled airlines only -- includes captain, copilot, and first and second officer with a first-class medical certificate.

Denials may be made at several levels within the FAA and/or by the AME. The final level of denial is, however, the one recorded on a pilot's medical records. Of the 842 airline pilot denials, 27.3 percent were general denials issued by the AMCB; 19.4 percent were AME denials (some of these denials could have been for the "mandatory" conditions that were never appealed by the applicant); 18.4 percent were administrative or legal denials by the AMCB; 11.6 percent were exemption denials; 8.6 percent were Federal Air Surgeon denials; 5.1 percent were mandatory denials by the AMCB which were not appealed to a higher level; and 4.7 percent were denials under FAR 67.31 for failure to provide additional information (see Figure 1).

As of December 31, 1976, there were 32,080 airmen between the ages of 25 and 59 who listed their occupation as airline pilot. As of January 1, 1982, there were 842 airline pilots who had been denied first-class medical certification during the past 10 years. These denials represent final denials; i.e., certificates were not issued at a later date.

The annual denial rate for airline pilots is, therefore, 2.6 per 1,000 active airline pilots, increasing from a rate of 0.4 in the 25-29 age interval to 10.9 in the 55-59 age interval (see Table I and Figure 2). The mean age of active (issued) airline pilots is 41.6 years, compared with a mean age of 51.6 for denied airline pilots.

Data on denials by airline employers provide some interesting insights, even though fraught with limitations that make comparison difficult; i.e., small numbers substantially affect comparison (see Table II). Of interest, however, is that the larger employers, many of which have/had their own medical facilities, have lower denial rates than the smaller employers. Preston (8) and others (1,3,4) found the same lower rates for larger airlines. Part of this difference is undoubtedly due to the preventive medical programs of the larger employers and their assumed association with other organizations' prevention and rehabilitation programs. Another part of the difference is likewise due to early recognition and removal from flight status of those pilots manifesting disease states (pathology) likely to result in denial and the fact that the major airlines have a larger, more select group of pilots from whom to choose when initially employed. The relative risk of medical certification denial for those pilots flying for airlines with no medical facility or cooperative agreement with a medical facility was twice the rate as for those pilots flying for airlines with some kind of in-house medical supervision.

Table III shows annual age-cause-specific denial rates increasing to the highest rate at age interval 55-59 (14.2 per 1,000 active airline pilots). The rate of medical disqualification is minimal before the age of 45 years but increases rapidly thereafter (from a rate of 1.4 at the 40-44 age interval to 4.1 at the 45-49 age interval).

Observed in the age-cause-specific annual denial rates is a rapid increase of cardiovascular denials after age 45. Nothing significant is found in the 25-29, 30-34, and 35-39 age intervals; however, in the 40-44 age interval, alcoholism and cardiovascular diseases (myocardial infarction, coronary artery disease, and bypass surgery) begin to be reflected. Cardiovascular causes for denial begin to increase rapidly in the 45-49 age interval, with myocardial

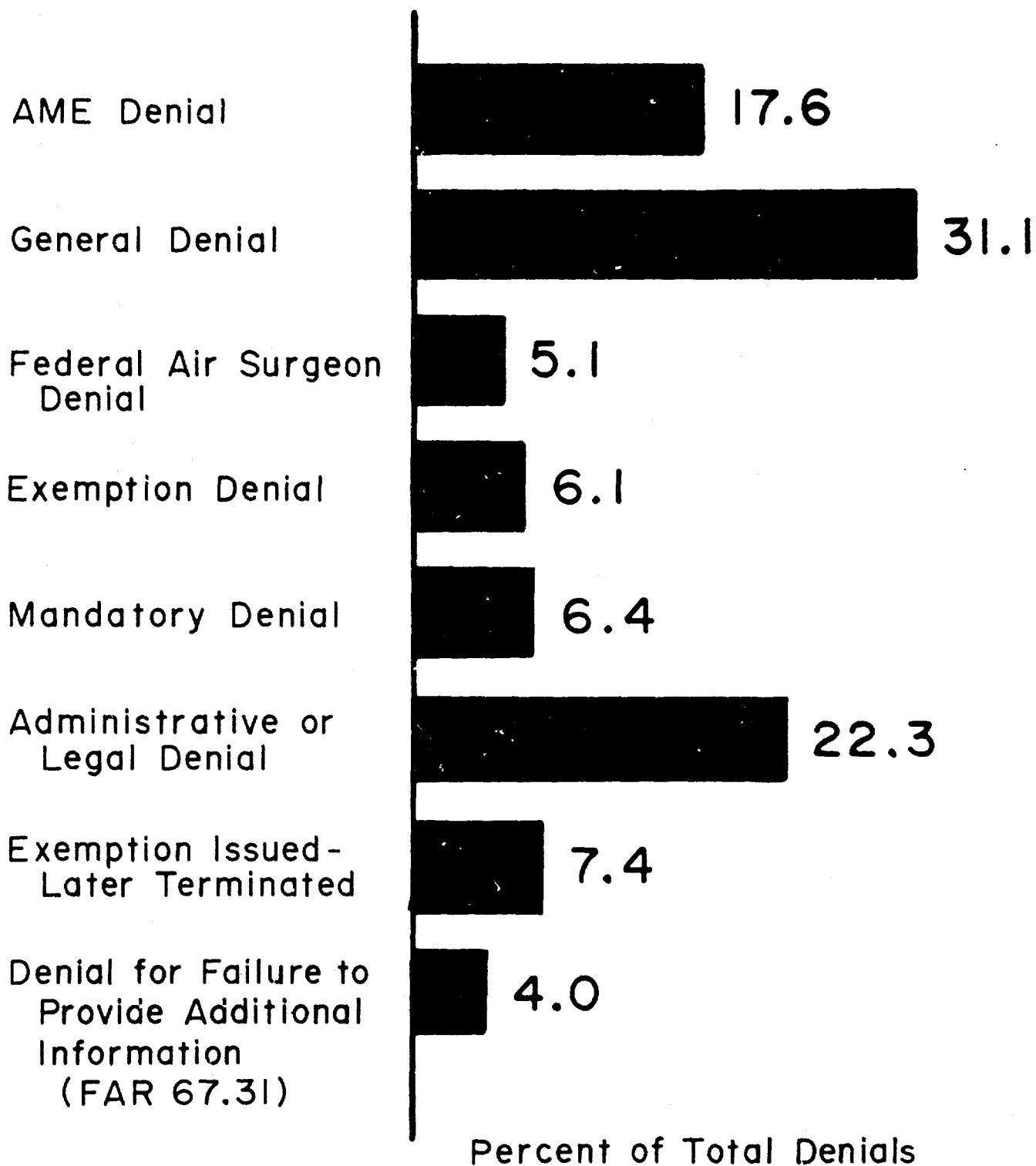


Figure 1. Denied airline pilots by level of denial.

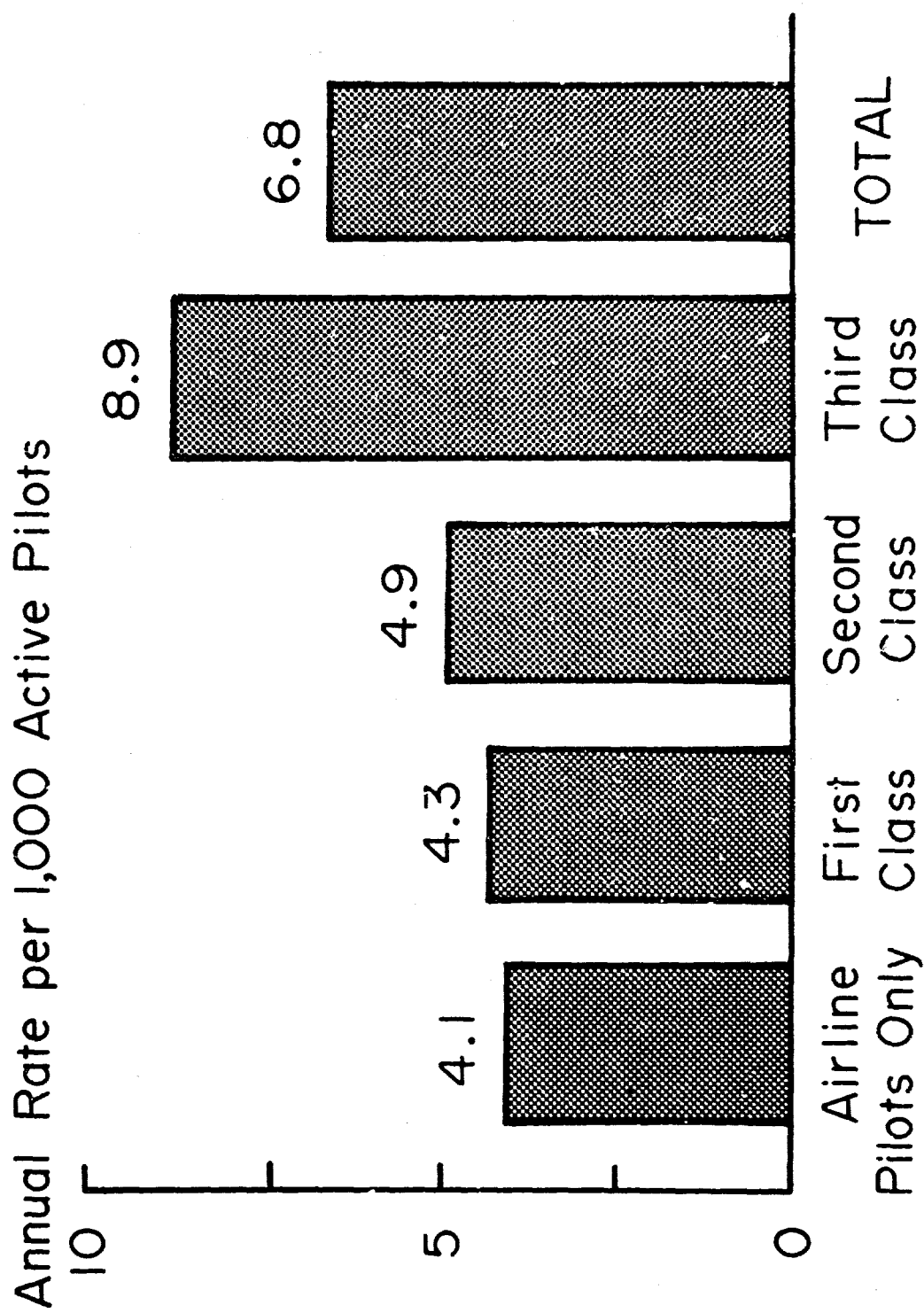


Figure 2. Denial rate comparison.

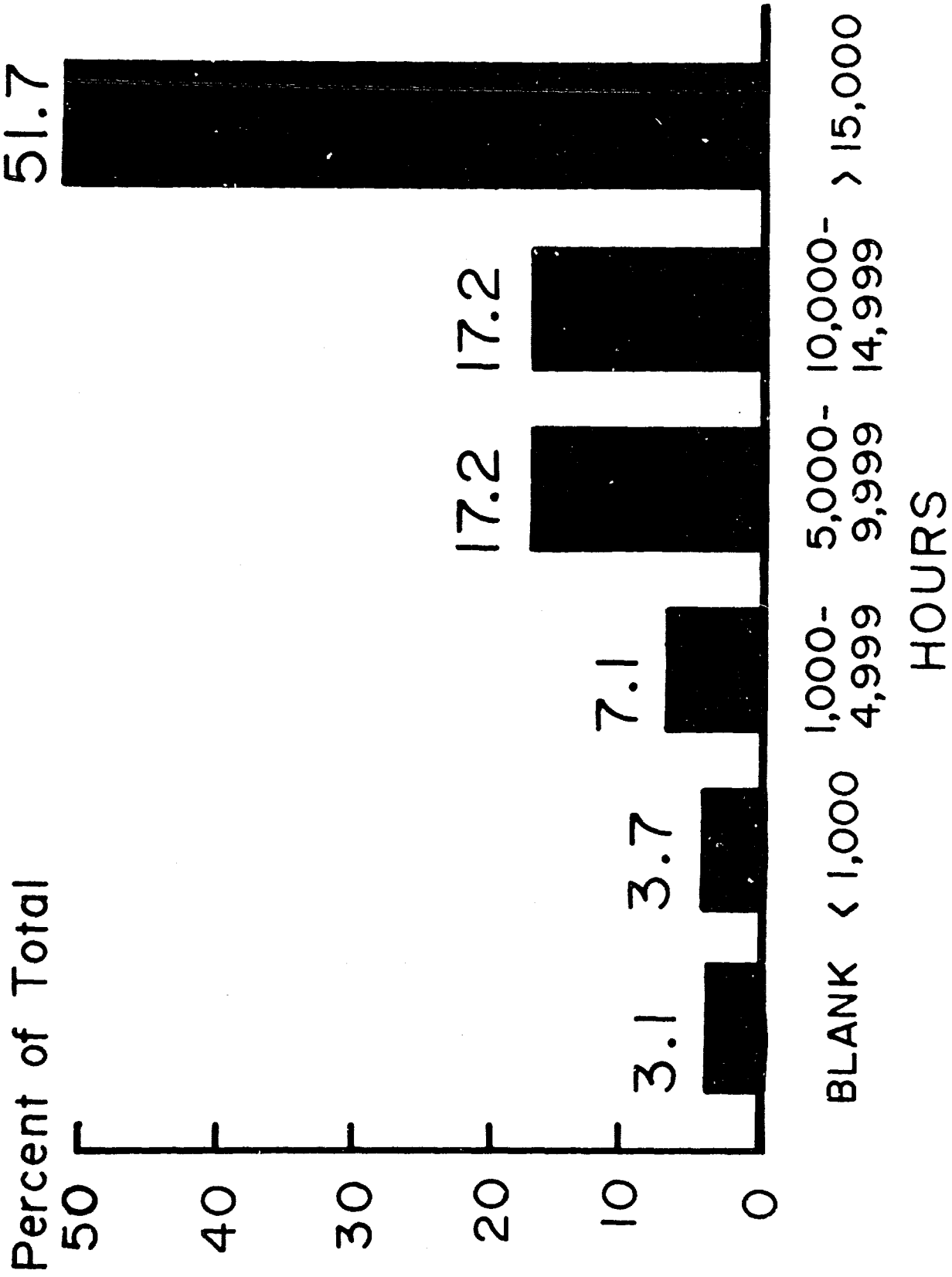


Figure 3. Denied airline pilots' total reported flying time.

Only aviation-connected employers are recorded on the computer record. Data on denials by these employers provide some interesting insight, even though fraught with limitations that make comparison difficult, i.e., small numbers substantially affect comparison. Of interest, however, is that the larger employers, many of which have their own medical facilities, have uniformly lower denial rates than the smaller employers. Preston (7) and others (1,3) found the same lower rates for larger airlines. Part of this difference is undoubtedly due to the preventive medical programs of the larger employers and their assumed association with other organizations' prevention and rehabilitation programs. Another part of the difference is likewise due to early recognition and removal from flight status of those pilots manifesting disease states (pathology) likely to result in denial and the fact that the major airlines have a larger, more select group of pilots from which to choose when initially employed (see Table I).

Annual age-specific denial rates increase to the highest rate at age interval 55-59 (14.4 per 1,000 active airline pilots). The rate of medical disqualification is minimal before the age of 45 years but increases rapidly thereafter (from a rate of 2.5 at the 40-44 age interval to 5.8 at the 45-49 age interval)(see Figure 4). Of the 110 pilots denied in the 55-59 age group, half (49 percent) were 58 or 59 years of age (25 percent were 59 when denied). The mean age of active (issued) airline pilots is 41.0 years of age, as compared to a mean age of 49.7 for denied airline pilots.

Observed in the age-cause-specific annual denial rates is a rapid increase of cardiovascular denials after age 45. Nothing significant is found in the 25-29 and 30-34 age intervals; however, in the 35-39 age interval, alcoholism, as a cause for denial, begins to be reflected in the denial rates. In the 40-44 age interval, alcoholism is again the highest cause for denial with cardiovascular diseases (myocardial infarction and coronary artery bypass surgery) second. Cardiovascular causes for denial begin to increase rapidly in the 45-49 age interval, with myocardial infarction highest; coronary artery disease second; use of disqualifying medications third (about two-thirds of these are directly related to cardiovascular disease); coronary artery bypass surgery fourth; and alcoholism ranking fifth. Cardiovascular diseases continue to increase and to represent the highest cause for denial in age intervals 50-54 and 55-59 (see Table II).

The overall highest causes for denial by pathology series are: (i) cardiovascular; (ii) neuropsychiatric; and (iii) the miscellaneous category which includes endocrinopathies, general systemic conditions, use of disqualifying medications, and denials for failure to provide additional medical information, with annual rates per 1,000 active airline pilots of 2.3, 1.3, and 1.1, respectively (see Figure 5).

The highest causes for denial by specific pathology are: (i) use of disqualifying medications (65 percent of these were also denied due to cardiovascular pathology); (ii) myocardial infarction; (iii) alcoholism; (iv) coronary artery disease; (v) hypertension with medication, and (vi) coronary artery bypass surgery (see Figure 6). These six specific causes account for almost 50 percent of all causes for denial.

Of the 43 denials for use of disqualifying medication, 28 (or 65 percent) were also denied because of cardiovascular problems. Of the 27 denials for hypertension with medication, 16 (or 60 percent) were also denied for disqualifying medication. Of the 30 denied for coronary artery disease, 12 were also denied due to coronary artery bypass surgery. Of

TABLE I. AIRLINE PILOT DENIALS BY EMPLOYER

<u>Employer</u>	<u>Annual Denial Rates Per 1,000 Active Airline Pilots</u>
Airlift International	14.8
Airwest	6.8
Alaska Airlines	6.7
Allegheny Airlines	3.5
American Airlines*	2.1
Braniff International Airways	3.3
Continental Airlines*	2.4
Delta Air Lines	4.3
Eastern Air Lines*	3.1
Flying Tiger Lines	12.6
Frontier Airlines	4.3
National Airlines	8.9
North Central Airlines	4.0
Northwest Airlines*	1.4
Ozark Air Lines	2.4
Pacific Southwest Airlines	3.0
Pan American World Airways*	4.8
Piedmont Aviation	10.2
Seaboard World Airlines	35.1
Texas International Airlines	12.1
Trans International Airlines	9.0
Trans World Airlines*	2.7
United Airlines*	2.6
Western Airlines	6.3
World Airways	2.7

Note: Asterisks indicate those airlines that have had their own medical facilities or cooperative agreement with a medical facility.

TABLE II. CAUSE FOR DENIAL OF AIRLINE PILOTS BY MAJOR BODY SYSTEM AND AGE\*

Cause	Age						Annual Denial Rate**
	25-29 Rate**	30-34 Rate**	35-39 Rate**	40-44 Rate**	45-49 Rate**	50-54 Rate**	
Eye	-	-	-	0.1	0.5	0.8	0.3
Ear, Nose, Throat	-	-	-	0.1	0.1	0.5	0.2
Respiratory	-	-	-	0.1	-	-	0.1
Cardiovascular	-	-	0.1	0.9	3.9	6.0	2.3
Abdominal (mostly GI, GU)	-	-	0.1	-	0.1	0.3	0.1
Neuropsychiatric	-	0.2	0.9	1.1	1.6	2.6	1.3
Bones & Joints	-	-	-	0.1	0.5	-	0.1
Muscles	-	-	-	-	0.1	-	0.0+
Miscellaneous	0.5	0.3	0.2	0.4	1.3	2.0	1.1
TOTAL	0.5	0.5	1.3	2.8	8.0	12.2	5.4

\*Refers to distinct pathological conditions cited as cause for denial. These figures do not represent applicants. One hundred seventy-six pilots were denied for a single cause; 89 for two causes; 13 for three causes; and 18 for no specific pathological cause.

\*\*per 1,000 active airline pilots.

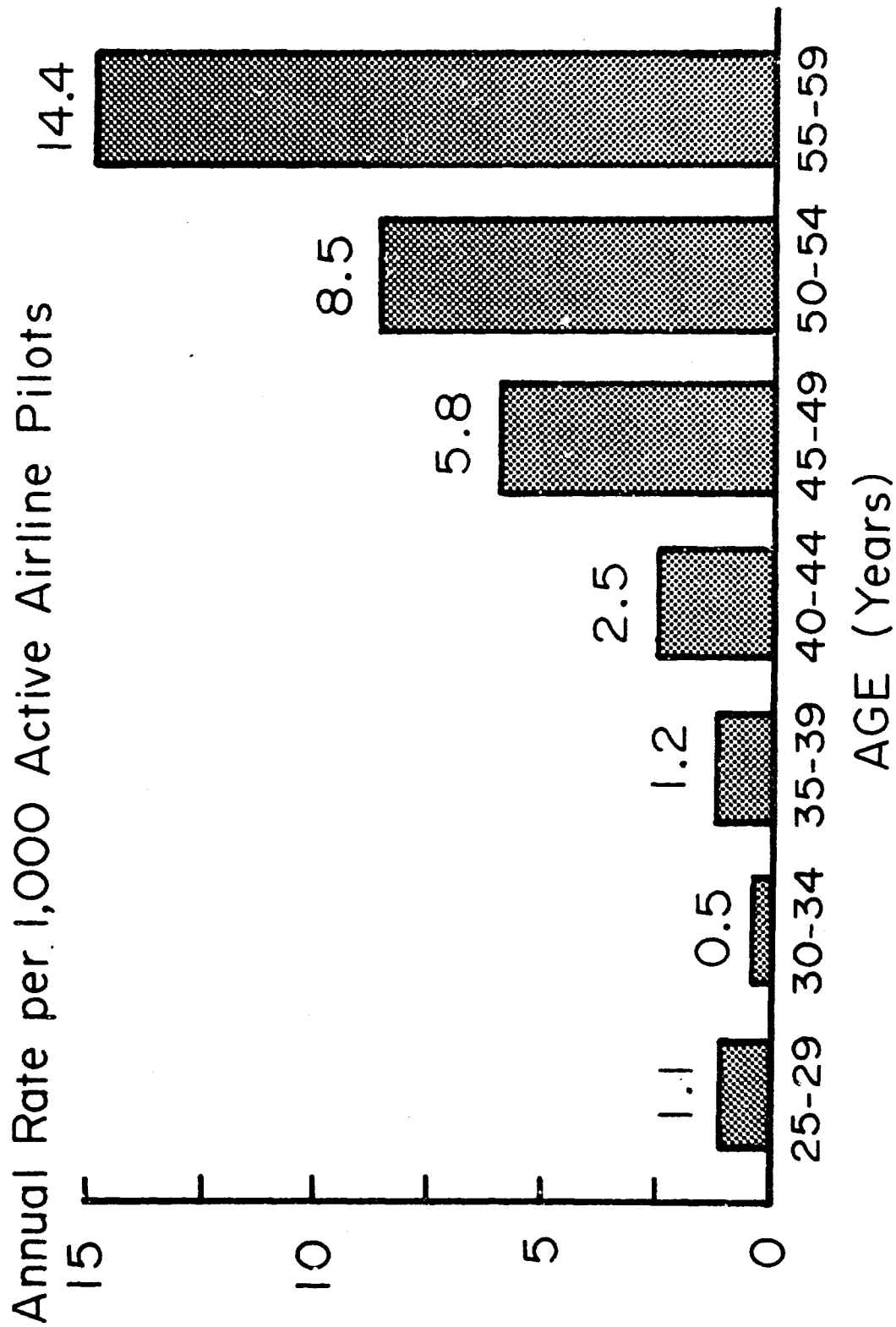
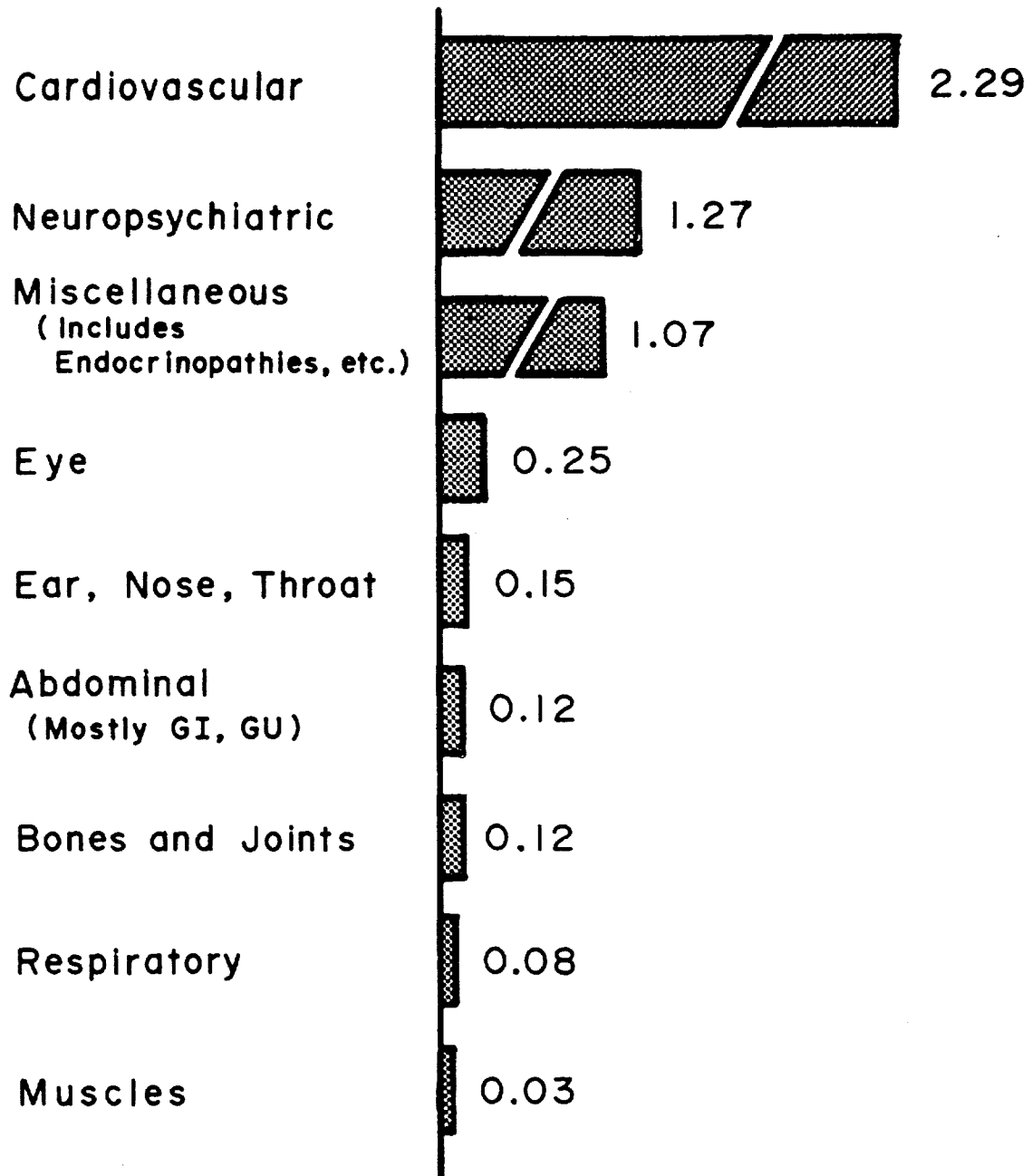
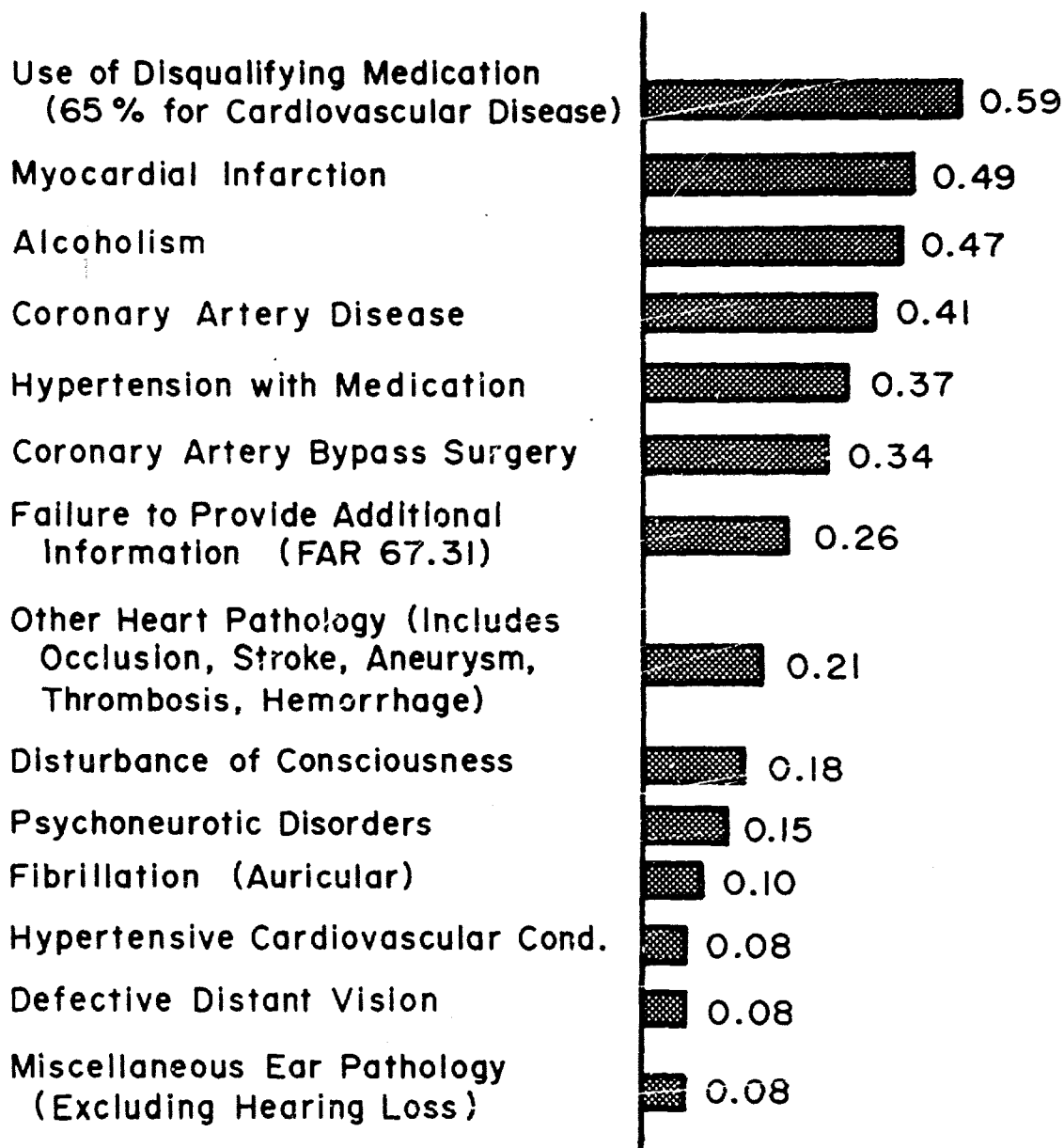


Figure 4. Airline pilots age-specific denial rates.



Annual Rate per 1,000 Active Airline Pilots.

Figure 5. Cause for denial of airline pilots by major body system.



Annual Rate per 1,000 Active Airline Pilots

Figure 6. The most frequently occurring causes for denial.

the 36 denied for myocardial infarction, 6 were also denied for coronary artery bypass surgery and 5 for coronary artery disease.

Eighteen pilots were denied for administrative reasons and had no pathology code recorded on their medical. One hundred seventy-six were denied for a single cause, 89 for 2 causes, and 13 for 3 causes. Approximately 8 percent of the denials studied have since reapplied and been issued first-class medical certification.

The Air Line Pilots Association (ALPA) states that it is part of an airline pilot's professional responsibility to recognize that any departure from good health status represents a threat to flight safety (3). Therefore, as suggested in the Orford-Carter report (6), pilots should be encouraged to report symptoms of disease, particularly cardiovascular and neuropsychiatric diseases. This requires education to the effect that failure to report symptoms to "avoid losing their job" may actually result in an unnecessary termination of their career.

This and other studies (1,3,4,5,6,7) support the need for airline medical departments, their contract doctors, and/or AME's to be informed that the maintenance of high standards of safety requires increasingly closer cardiovascular supervision after pilots reach 45 years of age.

#### SUMMARY

FAA medical certificate denial is minimal before age 45 but increases rapidly thereafter, with cardiovascular diseases responsible for more than half of this dramatic rise in incidence of disease.

The overall highest causes for denial by pathology series are: (i) cardiovascular; (ii) neuropsychiatric, and (iii) the miscellaneous category, which includes endocrinopathies, general systemic conditions, use of disqualifying medication, and denials for failure to provide additional medical information, with annual rates per 1,000 active pilots of 2.3, 1.3, and 1.1 respectively.

The highest causes for denial by specific pathology are: (i) use of disqualifying medications (65 percent of these were also denied due to cardiovascular pathology), (ii) myocardial infarction, (iii) alcoholism, (iv) coronary artery disease, (v) hypertension with medication, and (vi) coronary artery bypass surgery. These six specific causes account for almost 50 percent of all causes for denial.

Uniformly lower denial rates were found for the larger employers, many of which have their own medical facilities.

On the basis of these and previous findings regarding airline pilots, it is evident that maintenance of high standards of safety requires increasingly closer cardiovascular supervision as these pilots grow older.

## REFERENCES

1. Booze, C.F., 1974. Characteristics of medically disqualified airman applicants during calendar year 1971. FAA Office of Aviation Medicine Report No. AM-74-5.
2. Dark, S., 1980. Characteristics of medically disqualified airman applicants in calendar years 1977 and 1978. FAA Office of Aviation Medicine Report No. AM-80-19.
3. Eighth Bethesda Conference of the American College of Cardiology, Washington, D.C., April 25-26, 1975. Cardiovascular problems associated with aviation safety. FAA Office of Aviation Medicine Report No. AM-78-38.
4. Kidera, G.J., 1967. Clinical aspects of commercial aviation medicine. JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 201:242-246.
5. Lavernhe, J., J. Pasquet, and A. Mathivat, 1969. Incidence of cardiovascular diseases among the flight deck personnel of an airline. AEROSPACE MEDICINE, 40:62-63.
6. Orford, R.R., E.T. Carter, 1976. Pre-employment and periodic physical examination of airline pilots at the Mayo Clinic, 1939-1974. AVIATION, SPACE, AND ENVIRONMENTAL MEDICINE. 47(2):180-184.
7. Preston, F.S., 1968. Twelve year survey of airline pilots. AEROSPACE MEDICINE, 39:312-314.